F-35 Lightning II Program

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Turning Points Convinced Bogdan F-35 Would Succeed

It wasn't until Lt. Gen. Christopher Bogdan had been F-35 Program Executive Officer for about 20 months that he really began to feel that the program would make good. Bogdan, in an exit interview with Air Force Magazine (he is handing over leadership of the program to his deputy, Rear Adm. Mathias Winter, on Thursday), said the ability to fix three big problems—the June 2014 engine fire that grounded the fleet; persistent latency, jitter, and other issues with the helmet display, and the carrier variant's arrestor hook—proved "there was virtually nothing on this program we couldn't solve."

Lt. Gen. Christopher C. Bogdan, the program executive officer for the F-35 Lightning II Joint Program Office, speaks to airmen and civilian employees who work on the F-35A Lightning II at Nellis AFB, Nev., Aug. 27, 2015. Air Force photo by SSgt. Siuta B. Ika.

Programmatically, the turning point was a successful "win-win" contract with Lockheed on three lots, while militarily and politically, it was the on-time declaration of Initial Operational Capability with the Marine Corps and Air Force that sealed the deal for the F-35, Bogdan said.

The fire was "a very big deal and it happened at a very bad time," Bogdan recalled. The accident resulted in major damage to the one aircraft, forced a grounding of the fleet, and embarrassingly cancelled the F-35's premiere at the Farnborough Air Show, then only days away. It was "the only time on the program … where we were, no kidding, at least in the (Joint Program Office), working 24-7 … seven days a week," he said.

The Joint Program Office was laser-focused on figuring out "what went wrong, to get the fleet back in the air, to figure out the solution." Once the cause was found—excessive rubbing of the fan blades in an engine groove—jets could go back to flying as long as they got extra engine inspections. A fix to the design was quickly developed and cut-in on engine production.

"That was really the first time, from a technical perspective, that I thought, 'hmmm, we're probably getting better,'" Bogdan said.

The helmet has had six different issues over the last five years, and Bogdan said one of his "out on a limb" decisions was to break with the plan of his predecessor, Vice Adm. David Venlet, to spur a solution by creating a competitive, alternative source for the helmet.

"I cancelled the second program … for a couple of reasons," Bogdan explained. First, "I did have some confidence" that the helmet was going to be corrected. But he was also "putting my chips" on helmet contractors Rockwell and Elbit, and they knew it, and that told them "they better get this solved."

Bogdan said putting this confidence in the helmet team "changed their attitude, a little bit," and "it helped them come up with better solutions." It was "an important turning point" on the program because most observers don't realize "how important the helmet is to this airplane … It's another sensor. It's another part of the weapon system," said Bogdan.

Finally, the arrestor hook was critical because "from the Navy's point of view, if you cannot land safely on an aircraft carrier, you don't have a 'C' model." In initial tests, "we couldn't trap anything—we couldn't grab a hook on the ground" and "we were worried." The solution was developed by Fokker, the builder but "not the full design authority" on the hook.

“It’s a credit to Lockheed that they let us” hand over redesign authority to Fokker and “together we worked with Fokker to redesign that hook.” Yet again, “I thought, ‘hmmm, pretty good,’” Bogdan said.

Perhaps most compelling to Bogdan has been success in fixing the 3i and 3F versions of the F-35’s software. With the 3i version—which now equips USAF’s first operational squadron at Hill AFB, Utah—“the stability … was really bad,” he acknowledged. “We were getting radars turned off, we were getting sensors shutting down, we were getting timeouts on the ground, guys were having to ‘cold iron’ the airplane,” meaning that the whole jet—all systems, including engines had to be shut down—“kind of like … pulling the plug on your computer” to reboot the software. This might have to be done “two or three times to get it airborne.”

As a result, Bogdan decided to halt testing on 3F, the ultimate baseline software build. He said “we need to focus every effort, every person who has a role in mission systems software—the BAEs, the Lockheed guys, the radar guys, the sensor guys—forget 3F for now, we’ve got to fix 3i. Because if you don’t get 3i right, you don’t get 3F.” There was “lot of pushback from industry,” Bogdan said, because “they were worried about timelines and completing the program, and costs.” But if 3i went bad, Bogdan was convinced, “the program would flounder forever.”

A Red Team was brought in, and experts from other services and even some competitors, “believe it or not, with a non-disclosure agreement, and showed them some things. Some of the things they already knew.” Bogdan said, “Credit to Lockheed Martin that they were willing and open to bring in experts from outside [the company] to help look at this.”

Collectively, “we got the stability of the software much, much better. And we put a disciplined process in place to ensure that everything we learned on 3i was going to transfer to 3F … We weren’t going to walk down a path where we were going to add a capability to the software at the expense of stability.”

That, Bogdan said, “was a turning point,” because “once we got that fixed, I knew that 3F was going to be okay,” and therefore, “I knew we could get through the end of SDD [System Design and Development].”

Finding Common Ground

Those were the technical turning points, Bogdan said, but programmatically, the deals cut on Lots 6, 7, and 8 “were a lot smoother” than with Lot 5, “which took forever.” The JPO felt “we got a fair and reasonable deal and Lockheed thought it was a win-win also.” That meant “we could do business with Lockheed. That it was possible. That we could find a way to find common ground.”

But Bogdan was sweating the declaration of IOC. For the Marines, the target was July 2015, and for the Air Force, August of 2016. If those marks weren’t hit within “some reasonable time within their windows” it would have “set the program back years,” Bogdan asserted.

“I don’t think Congress would have been adding airplanes like they are now, I think there would have been way more scrutiny and oversight, from both our [international] partners, and [the Office of the Secretary of Defense], and the services.” The declarations of IOC—and both within a few days of the target—were the political turning points because “now you had the warfighter showing confidence in the weapon system,” and now the jet was in the hands of line pilots and maintainers who could “learn the most and teach us the most about the airplane, and we needed that desperately. We needed their feedback to make this weapon system better, and the sooner that happened, the better off we were.”

The IOC declarations “turned us from kind of a paper airplane and a weapon system that had a lot of bad history and bad baggage” into something real. “It kind of offset … the tragedies of the past, and people started getting a glimpse at how good the airplane could be.”